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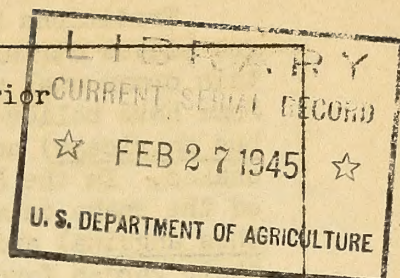
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FACTS ABOUT SNAKES¹

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SOME POPULAR MISCONCEPTIONS

Few native animals are more imperfectly known, more persecuted, or more misrepresented than snakes. Contrary to popular belief, most of them are neither obnoxious nor poisonous. Because of false teaching, many persons have a great dread of snakes, and there are very few who care to have these reptiles around their homes. Campers are often troubled with snakes that take refuge under bedding, boxes, or clothing, and nervous persons suffer severe shocks from discovering snakes in unexpected places. Constant worry, however, from fear that there will be a repetition of such unpleasant experiences can be avoided by taking necessary precautions. In most cases snakes can be prevented from entering places where they are not wanted.

¹/ Wildlife Leaflet 233 contains information on the "Poisonous Snakes of the United States," copies of which may be obtained from the Fish and Wildlife Service, Chicago 54, Illinois.

Traditions handed down by Indians and superstitions traceable to negro slaves during the early settlement of this country have credited certain ornamental plants with remarkable attributes as snake repellents. Some have believed that the odor or emanations from the mountain ash (Sorbus americana) and from its dead leaves on the ground are obnoxious to snakes. In the Southern States, colored people for generations have planted the snake calabash (Lagenaria vulgaris) and the snake gourd (Trichosanthes anguina) and trained the vines to grow over their houses and along their garden fences in the belief that the odor of these ground vines would repel snakes. The pungent fishy odor given off by full-grown leaves of the horseshoe geranium (Pelargonium zonale) is also thought by some to drive away snakes. Various other plants are supposed to possess similar powers, but careful investigation has failed thus far to corroborate any potency of this sort on the part of any plants. So far as known, no North American plants will drive away snakes or cause snakes to avoid areas on which they are growing. None of the various repellents, as cayenne pepper, fresh slacked lime, or powdered sulphur, which have been suggested from time to time has been found to possess any particular merit.

In many parts of the West the old-time horse or cow-hair ropes, about 30 feet long, were and still are used by cowboys, ranchers, and prospectors to surround their beds when they are sleeping on the ground, in the belief that such ropes exclude snakes. Experiments with live rattlesnakes as well as with harmless snakes have shown that no protection is afforded by a hair rope. Repeated trials have proved that a rattlesnake will crawl over a hair rope without hesitation.

SNAKE MYTHS

Since earliest times reptiles, particularly snakes, have been endowed by man with all sorts of mythical attributes and peculiarities; and a surprisingly large number of persons still cling to these ancient beliefs. The fairy tales of childhood become more vague with the passing of years, but it is no easy task to convince people that tales told about snakes are merely delusions. The superstitious fear of snakes in general has become so firmly fixed in our minds that it is almost impossible to eradicate it. Those who attempt to dispel stories about snakes sucking cows or about stinging snakes armed with an extraordinary spikelike tail, or stories dealing with hoop snakes that take their tails in their mouths and roll with incredible velocity in pursuit of a victim, are looked upon as contemptuous scoffers or else as lacking practical experience or even as mentally unbalanced.

Two of the most persistent and widespread snake myths in the United States deal with reptiles locally known as the "stinging snake" and the "hoop snake." Tales have long been told by negroes in the South of snakes that have tails furnished with horns and that form themselves into hoops and roll with race-horse speed in pursuit of their victims. If the victim dodged and a tree was struck, it was sure to die. That any snake can place its tail in its mouth and roll along like a hoop is manifestly absurd, and taking into consideration the anatomical peculiarities of the vertebral column,

it is clearly impossible. The "stinging snake" myth apparently originated more than 200 years ago and is reported to have been first published in an old "report to the Lords Proprietors of the Carolinas." John Clayton also related this myth in a letter to the Royal Society of London in 1688. In the first-mentioned report it is asserted that there lived in the Carolinas a snake the tail of which was a poisoned horn or spike. This account refers to the horn snake (Farancia abacura), which is harmless. This snake is bluish black with a few red bars across the belly, and its tail tapers to a fine point having the appearance of a horn or spike, but it is quite incapable of piercing or stinging anything.

Another superstition concerns the glass, or joint, snake, which is really a legless lizard. It is often said that a stroke of a stick will cause the body of this reptile to disjoint, the pieces wriggling off in every direction and coming together again if the head part is not captured or destroyed. According to one version there is one particular section that is endowed with the power to control the movements of the other joints, and if this is destroyed, the reptile is deprived of its power to reassemble again. The explanation of this curious belief lies in the ability of this reptile to drop its tail, an act that sometimes enables it to escape while the still wriggling tail attracts the attention of the pursuer. Many other lizards have the same power, and a "spike" or short and imperfect tail grows in the place of the one lost. This curious reptile is rarely seen, as it lives under decaying vegetation and leaves, or burrows in the soil, but is sometimes turned up by the plow. It has long been the subject of discussion, but it is merely a harmless, legless lizard (Ophisaurus ventralis), which because of its food habits is of considerable value to agriculture.

Some snakes have been accused of sucking milk from cows. Anyone who has ever milked a cow knows that the suction required to obtain a flow of milk is much greater than could be exerted by any snake. Furthermore, a snake has two rows of sharp recurved teeth in the upper jaw. If the mouth of the "milk snake" were closed to permit suction, the teeth would sink into the teat and the snake would find itself fully occupied in efforts to avoid injury by the cow.

The spreading viper, or puffing adder (Heterodon contortrix), also known in certain sections as the blowing adder, hissing viper, and sand snake is one of the greatest bluffers among snakes. Most of the names given to it refer to its habit of spreading its head and neck and hissing in a threatening manner. These actions have given rise to various superstitions, one of which is that its breath will kill a person as far away as 20 feet. This snake is entirely harmless. It is not poisonous and its teeth are too short to inflict a wound in case it did strike at a person. One of the peculiar habits of this snake is that of feigning death, which it accomplishes by rolling over on its back. When turned over, it immediately resumes this absurd position.

The coach-whip snake (Coluber flagellum) of the South is the object of a curious superstition prevalent among the negroes and even among many of the whites. This snake has long been a terror to the colored population of the South, and many are the stories that relate to negroes found dead in the road from being whipped to death by coach-whip snake. These stories no doubt had their origin in warnings given years ago to restrain the negro slaves from straying off at night. The coach-whip is a slender, swift-moving, brownish-black snake of the southern and southwestern parts of the United States, and is entirely harmless to man. Its habit of raising the fore part of the body when traveling confirmed, so far as the negro was concerned, the stories that had been told him.

GENERAL HABITS OF SNAKES

There are many kinds of snakes and their habits are nearly as varied as those of birds and mammals. Some snakes burrow into the ground and are rarely seen; others are gliders and move swiftly; some are swimmers and spend most of their lives in swamps, ponds, or streams; a few climb trees. There are certain kinds that are found only in desert regions, others only in marshes, and many that live in the fields and woods about human habitations.

Most snakes are "gliders." Along the entire length of the ventral surface of the body are large transverse scales of shields, as many as there are pairs of ribs. As the snake glides, the fore part of its body is first advanced; the ventral transverse scales on this part are then partially erected, the weight of this part of the body is thrown on these erected transverse scales, and a rather firm hold is obtained on the surface; the rest of the body is then drawn forward by the contraction of muscles. This process is rapidly repeated. As the ribs are active agents in this peculiar method of propulsion, snakes are sometimes referred to as "rib-walkers."

Snakes that climb are more agile than terrestrial species. Some wind their bodies around the tree; others, like blacksnakes, can climb rough-barked trees by progressing in wide sinuous curves.

In swimming, a snake depends as much upon undulating movements of the body as upon short strokes of the tail.

HIBERNATION

In temperate climates all snakes hibernate. Their chance of survival in northern latitudes depends on their evading frost. Snakes are extremely sensitive to cold; many of the common North American forms do not range much further north than the Canadian border, and others stay south of the Ohio River. The exceptionally wide range of the garter snake is known to extend northward to the region around Great Slave Lake, and there are records of it that seem to be authentic from the Yukon region. In relatively mild climates blacksnakes have been found hibernating in cavities in trees several feet from the ground. Rattlesnakes, copperheads, and

certain other snakes have dens in rocks, in which they hibernate during the coldest part of winter. At times large numbers of snakes congregate in a single cavity, where they pass the winter. References are found in literature to "bundles" of snakes found by workmen blasting in regions underlaid by a rock formation. Various species burrow in the soil to escape the cold.

Except certain species adapted to extremes in aridity, snakes, especially the subaquatic types, succumb also to intense heat. It has been reported that even the rattlesnakes that frequent the Mohave Desert can be killed by 20 minutes' exposure to the direct rays of the midday sun. A number of snakes estivate, suspending their normal activities during the hottest part of summer.

SHEDDING SKINS

All vertebrates slough off the epidermis from time to time. In human beings the change is gradual and imperceptible; other mammals, as rabbits, mice, and squirrels, change their hair in spring and fall; the "molt" of birds is well known. In the case of snakes, the entire epidermis, including that covering the cornea of the eye, is sloughed off whole.

The process of sloughing starts at the jaws, and the snake gradually crawls out of the cast-off epidermal layer. The length of time between successive slough varies. In captivity some snakes shed about every month even during the coldest part of winter. The frequency of sloughing varies with different individuals and possibly in the same individual at different ages. Prof. Samuel Garman reported that a large king snake in his possession shed its skin in April, July and December, as did its mate in March, May, August and October. These snakes were kept in a room throughout the year.

Ordinarily, about two sloughs are cast in a season, one when the snake comes out of hibernation in spring and another about midsummer or later. A young and growing snake, however, sheds its skin more frequently. The milky appearance of the eyes of a snake shortly before the slough is cast is due to the separation of the outer layer of epidermis from the cornea, resulting in impaired vision. This gives rise to various superstitions regarding snakes going blind during dogdays.

ECONOMIC VALUE OF SNAKES

Many of the common snakes are largely beneficial and should be protected. Such snakes are not poisonous and although they may bite or attempt to when captured, their bite is usually no more than a scratch and is nonvenomous. Snakes devour large numbers of insects and mice, many of which are injurious to garden crops and stored foodstuffs.

One of the most abundant snakes in many parts of the United States is the common garter, or ribbon, snake (Thamnophis). The natural food of these snakes consists of salamanders, small frogs, earthworms, insects, spiders,

and an occasional mouse. When grasshoppers are plentiful, the garter snakes often subsist largely on them.

The blacksnake (Coluber obsoletus) and the pine snake (Pituophis melanoleucus) feed largely on field and meadow mice, chipmunks, rats and young rabbits, and to a less extent on birds, frogs, and insects.

The house snake, or checkered adder (Lampropeltis triangulum), lives in gardens and fields and although it is entirely harmless, there seems to be much superstitious fear of it. The name "house snake" has been given it because it enters dwelling, especially in fall. More than half of its yearly food consists of mice. It has been known also to eat other snakes.

The king snakes (Lampropeltis getulus) are able to kill rattlesnakes and have been known to eat them. When the early settlers found these snakes fairly common throughout the region infested by rattlesnakes and moccasins, stories soon arose of their hunts for rattlers. The king snake does eat other snakes, but it does not deliberately hunt the poisonous kinds.

The little red-bellied snake (Storeria occipito-maculata) feeds to a large extent on slugs, pests very destructive to garden crops. The DeKay snake, or rock snake (Storeria dekayi), also eats slugs, and in addition, snails, earthworms, and insect larvae. Insects constitute the main source of food of the smooth-scaled green snake (Liopeltis vernalis) and of the rough-scaled green snake (Opheodrys aestivus), but snails and spiders form about one-fourth of the total bulk.

The pretty little ring-necked snake (Diadophis punctatus) feed mainly on insects and to a lesser extent on salamanders, small frogs, and earthworms. The rubber boa, or ball snake (Charina bottae), eats mice and small birds. Bull snakes and gopher snakes (Pituophis) destroy large numbers of injurious rodents in the course of a year. Even rattlesnakes are useful in their feeding habits, because ground squirrels, young prairie dogs, and other rodents comprise their main food.

The food habits of a few of the snakes are of such nature that they conflict with man's interests. The common water snake (Natrix sipedon) feeds largely on small fish, but on examination in most cases the greater part of its food has been found to consist of fishes not used as food by man and the remainder include toads, frogs, salamanders, insects, and small mammals. The moon snake, or queen snake (Natrix septemvittata), subsists largely on crawfishes and toads. The blacksnake (Elaphe obsoleta) and the coach-whip snake (Coluber flagellum) destroy a certain number of ground-nesting birds, particularly young quail, and eggs in the nest, and have been known to eat young chickens and even young pheasants. The spreading adder (Heterodon contortrix) is destructive to toads, at least in the Eastern States. In the Middle West, this species has a more varied diet, for mice, grasshoppers, and other insects form a large part of its annual food.

In appraising the food habits of any animal, some allowance must be made for local conditions. Snakes, like other animals, will satisfy their

hunger with whatever food is available. Whenever snakes are present in what appears to be abnormally large numbers, there must be an abundance of living animal food in the vicinity to attract them. Poisonous snakes have no place in a settled country, no matter how beneficial their food habits may be. Most of the nonvenomous snakes, however, should be given as much consideration as any other animal that directly or indirectly assists man in combating pests that may devour his crops.

PRECAUTIONARY MEASURES AGAINST SNAKES

There is little likelihood of accidents from snakes if the following suggestions are borne in mind:

Campers should avoid pitching their tents in swampy areas or in the vicinity of rocky ledges. Clean camping sites are preferable. Every one should take the necessary precautions of observing where he walks and especially where he puts his hands. Bedding and clothing should be hung up during the day.

Hunters in southern States have found that leather leggings afford sufficient protection against the bites of poisonous snakes, and a specially constructed boot, with the shank made of leather and lined with several layers of fabric, used by quail hunters in Florida, is a perfect protection for the parts it covers.

Information on poisonous snakes and methods of treating their bites is contained in Wildlife Leaflet 233, "Poisonous Snakes of the United States" (see footnote, page 1).

SUGGESTIONS FOR SNAKE-PROOFING A BUILDING

When snakes gain access to a building, the doors and windows of which are screened, there must be crevices in the walls, foundation, or floor. In such cases all opening in the floor weather-boarding, sills, foundations, and around fireplaces and chimneys should be sought and carefully closed up. If a building can be surrounded by a fairly deep vertical-sided trench with no bridges over it, snakes will be excluded, but in ordinary soils such a trench will not long retain its effectiveness. A permanent concrete moat would in most cases be considered too expensive.

To exclude snakes from a building the basement walls should be tightly constructed or the sides of the cellar sealed with a layer of cement. Foundations under houses and barns may be "pointed-up" with cement in the same way. If the walls under any building are sealed with cement and all low windows screened, snakes and other undesirable animals cannot gain entrance. The debris that often accumulates under porches should be removed and the space kept clean.

SUGGESTIONS FOR ERADICATING UNDESIRABLE SNAKES

There are so many snakes in many neighborhoods and they frequent such

inaccessible spots that their total eradication is practically impossible. So long as there are large uninhabited areas, snakes will continue to spread from these centers into settled districts, even though a constant warfare be kept up against them. The introduction of predatory animals, especially the mongoose, no matter of which sex, to combat them, is never desirable because they will destroy at least as many ground-nesting birds as they will injurious animals. The importation of mongooses is prohibited by law.

So far as known, only one method of eradicating snakes is generally successful, and that is to kill them by clubbing or shooting. Local campaigns for destroying such poisonous snakes as the cottonmouth moccasin, the copperhead, the rattlesnake, the massasauga, and the coral snake are desirable in many districts. Most of the nonpoisonous snakes are distinctly beneficial for their food consists to a large extent of injurious rodents and insects, and all campaigns against snakes should discriminate between poisonous and nonpoisonous, and between harmful and useful, varieties.

USE OF POISONOUS GASES

Snakes seem to be immune to the effects of certain kinds of poisonous gases, including phosgene, chlorine, and tear chemicals. Tests conducted in a cave near San Marcos, Hays County, Texas, approximately 50 miles north of San Antonio, failed to produce any results when phosgene and chlorine fumes were forced under pressure into the recesses of a rocky cave infested with rattlesnakes. On the other hand, in the State of Washington, when mustard gas was pumped into the crevices of a bed of lava rock, rattlesnakes were driven out in a dazed condition and were easily killed with clubs.

Field employees of the Fish and Wildlife Service have had much success in destroying rattlesnakes with crude calcium cyanide. It has been found that 2 ounces of calcium-cyanide dust (about two tablespoonfuls) are required to kill a rattlesnake that has taken refuge in a ground-squirrel or prairie-dog burrow. The cyanide should be placed well down in the burrow by means of a ladle or long-handled spoon and in a mass rather than scattered. A stone or piece of sod should be used to cover the entrance rather than soil, which might slide into the hole and interfere with the formation of the gas. Under ordinary conditions a snake will be killed by about 30 minutes' exposure to the cyanide gas.

Calcium cyanide is a deadly poison. It should be kept in the original air-tight container and out of reach of irresponsible persons, children and livestock. Small quantities of cyanide may be carried to the area to be treated in a can fitted with a tight top. All handling of the material should be done in the open air.

The effectiveness of calcium cyanide gasing depends on relative humidity, for moisture in the air combining with the cyanide liberates hydrocyanic-acid gas, which remains active in the burrow for several hours, diffusing in all directions. Unsatisfactory results may be expected, how-

ever, when calcium cyanide is used in rainy weather. Temperature is not a limiting factor, provided the snakes are not hibernating. The quantity of calcium cyanide necessary to kill snakes in a den or cave depends on the number of cubic feet of air space to be saturated with the poisonous gas. In general, it appears that 2 ounces of cyanide will liberate a deadly concentration of gas in a space not exceeding 5 cubic feet, provided there is no leakage. Calcium cyanide is offered for sale in 1 and 5 pound cans. A list of dealers will be furnished by the Fish and Wildlife Service on request.

If snakes prove troublesome by entering houses or buildings used for workshops and storage and the buildings are so constructed that they can be tightly closed or sealed up for short period, fumigation with hydrocyanic-acid gas is recommended. Full instructions for using this gas are contained in Circular 369, which may be obtained on application to the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, Washington, D. C. Buildings in which hydrocyanic-acid is used must be vacated for a day or more, for this gas is extremely deadly and will destroy every living thing within the building.

OTHER METHODS OF ERADICATION

In spring entire colonies of rattlesnakes and copperheads can be destroyed if the place where they have wintered is discovered. Here in the early days of March and April they emerge to lie in the sun and are so sluggish that they may easily be dispatched with clubs. Later on in spring they spread out to the hillsides and fields in search of mice, small birds, and other prey. Where conditions permit, number of hogs, if given free run of snake-infested areas, will greatly reduce the snake population. Except by this method or by gasing, control measures cannot be applied against snakes on a large scale, and each reptile has to be dealt with individually.

No successful apparatus for snaring snakes has ever been devised. It is difficult to induce a snake to enter a trap, for it has no fixed trails and lacks inquisitiveness. Some collectors have been able to capture certain kinds of snakes by tying a small frog by one leg to a stake in suitable surroundings. The snake swallows the frog and is held captive until digestion dissolves the swallowed bait giving the trapper opportunity to return and dispose of the snake. Another method is to dig pits three or more feet deep with vertical sides and place several live frogs or mice in them for decoys. Such pits should not be made in any neighborhood where either livestock or human beings are accustomed to travel. Professional collectors depend almost entirely on a forked stick or a pair of iron tongs, 3 or 4 feet in length, to capture snakes.

A few snakes like the blacksnake, (Coluber constrictor) and chicken snakes (Elaphe quadrivittata and Elaphe obsoleta confinis) enter poultry houses and barns in search of eggs or young birds. Snakes known to feed on eggs may sometimes be killed by poisoned eggs. The most satisfactory method of preparing the bait is to make a small hole in a fresh egg and

introduce through it 2 or 3 medium-sized crystals of strychnine. A piece of paper should then be pasted over the hole and allowed to dry. To prevent leaking when the poisoned egg is put out for the snake, care should be taken to see that the part of the egg with the hole in it is placed highest. This remedy will prove effective only in case a snake has formed the habit of raiding hen's nests. Poisoned eggs placed at random may never be taken and within a few days become unattractive as bait. The promiscuous distribution of poisoned eggs is very dangerous also, as it may cause the death of domestic animals, especially hogs. Blacksnakes and chicken snakes are not very wary and appear incapable of detecting "doctored eggs." Most of our snakes feed chiefly on living prey, and thus cannot be destroyed by the use of poisoned baits.